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outlet tube from the interior of said chamber portion, providing a cable which includes a casing and conductors supported by said casing, providing an end cap for said chamber portion of said housing member, connecting said casing of said cable to said end cap, coupling said conductors of said cable to said input electrical terminals of said receiver, and installing said receiver in said chamber to insert said outlet tube into one end of said passage after said coupling of said conductors to said terminals, securing said end cap to said housing member after said installing of said receiver in said chamber, [and] installing said acoustic damper in the opposite end of said passage, and adjusting said receiver and acoustic coupling means to substantially compensate for the external field resonance of the ear.

REMARKS

This amendment and response responds to the Office Action of January 26, 1994. By this amendment, claims 4, 6-9, 17, and 19-21 are canceled without prejudice and claims 1, 2, 5, and 14-16 are amended. Claims 1, 2, 5 and 10-16 are pending. Claims 10-11, which are dependent from amended claims, are resubmitted without amendment. Claims 12-13 are resubmitted without amendment but are believed allowable for the reasons discussed below. Favorable consideration of the claims as now submitted is earnestly solicited.

The applicants are believed to be the first to have successfully designed and built a high-fidelity insert earphone. The applicants unique combination of acoustic coupling and damping means compensates for the loss of external ear resonance and results in an insert earphone which achieves high fidelity reproduction.

To the applicant's knowledge, none of the prior art references cited by the examiner achieves this result. The applicant's application of high-fidelity principles to an insert earphone has resulted in perhaps the best available earphone on the market today. (Product reviews attached as exhibits A, B).

Surprising results are an indicator of the non-obviousness of an invention. Continental Can Co. USA, Inc. v. Monsanto Co., 948 F.2d 1264, 1273 (Fed. Cir. 1991) ("[w]hen differences that may appear technologically minor nonetheless have a practical impact, particularly in a crowded field, the decision - maker must consider the obviousness of the new structure in this light.") (Exhibit C). The result achieved by applicant's structure is directly attributable to the combination of an acoustic damper and coupling means, in sealed relationship with the ear canal and receiver, and acoustically matched to the external ear resonance of the ear. Even if applicants invention is a combination of old elements, the surprising and unique results obtained are indicative of non-obviousness. In re Murch, 464 F.2d 1051, 1056 (C.C.P.A. 1972) (reversing a finding of obviousness based on the applicants discovery of unanticipated features of the claimed compound).

In order to further distinguish applicant's invention, all remaining claims in the application have been amended to add or further define the limitation of a damped coupling assembly operative to substantially compensate for a loss of external-ear resonance.

The examiner has rejected claims 4, 5 and 14 as indefinite under 35 U.S.C. § 112. Claim 4 has been cancelled, and the applicant's amendment of claims 4, 5 and 14 is believed to overcome the examiner's objections by providing the proper antecedent basis for "said resilient mounting means."

The examiner has rejected claims 1, 2, 6-9, 12, 13, 16 and 17 under 35 U.S.C. § 103 as being unpatentable over Voroba et al. in view of Langford.

The applicant has cancelled claims 6-9, and 17. The applicant respectfully traverses the examiners rejection of the remaining claims on the grounds that neither Langford nor Voroba contain any structure which solves the problems and achieves the result solved by the applicant in claims 1-2, 12-13 and 16.

Voroba's lack of appreciation of the problem of providing high fidelity is illustrated by the following quotation from Voroba's specification:

Tubular segment 38 surrounding opening 34 allows tip 38 of the aid to be extended further into the ear canal of the user. This is desirable since the closer the orifice of tubular segment 38 is to the eardrum, the greater the effective sound output of hearing aid 10.

Voroba Specification, col. 9, lines 9-13. Voroba failed to appreciate the need to match the earphone with the acoustic characteristics of the external ear to achieve high fidelity.

Furthermore, neither Voroba nor Langford teaches preserving an acoustically sealed relation between the output of the receiver and the ear canal. In fact, both Voroba and Langford teach away from sealing the acoustic path.

Earshell assembly 12 is also preferably provided with vent channels 130, 132 and 133. The vent channels allow air to bypass the amplifying portion of hearing aid 10 and circulate to the eardrum.

Voroba Specification, col. 10, lines 65-68.

In a preferred form of the invention, a second opening 45 is provided in the closed end of the shell. This opening serves to vent the sealed region of the ear canal to the outside atmosphere to compensate for changes in ambient atmospheric pressure.

Langford Specification, col. 3, lines 33-37.

The acoustic seal provided by applicant's invention contributes to the superior acoustic performance of the device and was not taught or appreciated by Voroba or Langford.

Since the remaining claims contain these limitations not disclosed by Voroba or Langford, it is believed the examiner's rejection of these claims has been overcome.

The examiner has rejected claims 4, 5 and 14 under 35 U.S.C. § 103 as being unpatentable over Voroba et al. in view of Langford and further in view of Busse or Gauthier.

Claim 4 has been cancelled, and claim 5 has been rewritten to depend from claim 1 which is believed allowable for the reasons discussed supra. Claim 14 has been amended to add the limitations

of acoustic coupling means substantially matching the loss in external ear resonance of the ear and calling for an acoustically sealed relation between the outlet of the receiver and the ear canal. The examiner's citation of Voroba and Langford is thereby believed to be overcome.

The applicant notes that the examiner has also cited Busse and Gauthier. The applicant notes that while Busse and Gauthier teach hearing aids in which the ear canal is sealed, neither teaches how to provide a high-fidelity earphone of the type described by the applicant. Busse, for example, is directed to a hearing aid which is not acoustically matched to compensate for the loss of external ear resonance, while Gauthier is directed to a hearing aid where the receiver is positioned in the center of a chamber adjacent the eardrum in an attempt to take advantage of the "horn effect."

The examiner has rejected claim 15 under 35 U.S.C. § 103 as being unpatentable over Voroba et al. in view of Langford as applied to claim 12 above, and further in view of Kelsey.

The applicant has cancelled claim 15 without prejudice.

The examiner has rejected claims 10-11 under 35 U.S.C. § 103 as being unpatentable over Voroba et al. in view of Langford as applied to claim 1 above, and further in view of Killion (4,677,679) or Marutani (JA 61-238196).

The applicant notes that both claims 10 and 11 depend from claim 1, which is believed allowable for the reasons discussed supra. The applicant notes that even though Killion '679 teaches an equalization network, Killion does not teach an insert earphone

of the type taught by applicants. Killion discloses a "tube phone" which has the receiver located a foot or more from the ear and the damping assembly adjacent to the receiver. The earphone of Marutani does not appear to have any of the essential structure disclosed by the applicants.

The examiner has rejected claims 19 and 20 under 35 U.S.C. § 103 as unpatentable over McCabe in view of Killion or Marutani, and further in view of Langford.

The applicant has cancelled claims 19 and 20, without prejudice.

The examiner has rejected claims 1 and 2 under 35 U.S.C. § 102 as being anticipated by Miyahra.

The applicant respectfully traverses the examiner's rejection. Miyahra is directed to the problem of reducing vibrational feedback in a hearing aid, and does not teach how to make a high-fidelity insert earphone, as discussed supra. Miyahra's structure does not include the elements of a damped coupling assembly operative to substantially compensate for the loss of external ear resonance and a passage in an acoustically sealed relationship between the receiver and the ear canal.

The examiner has rejected claims 4, 5, 8, 9, 12-14, 16 and 17 under 35 U.S.C. § 103 as being unpatentable over Miyahra et al. in view of Busse or Gauthier.

The applicant has cancelled claims 4, 8, 9 and 16. As to claims 5, 12-14 and 17, these claims all contain the limitations regarding substantially matching the external ear frequency

response. Miyahra, Busse, and Gauthier do not address this problem, as discussed supra.

The examiner has rejected claims 6, 12, 13 and 15 under 35 U.S.C. § 103 as being unpatentable over Miyahra et al. in view of Kelsey.

The applicant has cancelled claims 6 and 15. Claims 12 and 13 both contain the limitations regarding acoustic sealing and substantially matching the external ear resonance of claim 1, discussed supra, and are believed allowable for the same reasons.

The examiner has rejected claims 7, 8, 9, 16 and 17 under 35 U.S.C. § 103 as being unpatentable over Miyahra et al. in view of GB 2155276 ('276).

The applicant has cancelled claims 7, 8, 9 and 16. Regarding claim 17, the applicant respectfully traverses the examiner's citation of Miyahra for the reasons cited supra, while noting that GB '276 is directed to an improved earwax guard and does not disclose a high fidelity earphone.

The examiner has rejected claims 10, 11 under 35 U.S.C. § 103 as being unpatentable over Miyahra et al. in view of Killion or Marutani.

The examiner's citation of Miyahra is respectfully traversed for the reasons discussed supra. While Killion ('679) does teach an equalization circuit and suggests the use of that circuit to compensate for the frequency response characteristic of the human ear, Killion ('679) does not teach that such compensation can be accomplished with the acoustic coupling structure of applicant's

invention. Moreover, Miyahra does not teach a high fidelity earphone but rather a hearing aid.

A favorable action is earnestly solicited.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'G. Schodde', written over a horizontal line.

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Attachments

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